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STABILIZER FOR ACIDIC PROTEIN BEVERAGES

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Abstract

A stabilizer for acidic protein beverages comprising polyacrylate and traditional stabilizers propylene alginate, sucrose fatty ester, sodium hydroxymethylcellulose (or pectin), sodium tripolyphosphate and sodium pyrophosphate, and said stabilizer is resistant to high temperature, capable of retaining the stability of its system while being sterilized at 124°C, and is a novel type of stabilizer for protein beverages.

Claims

1. A stabilizer for acidic protein beverages, characterized in that the stabilizer has the following composition:

Sodium polyacrylate

Propylene glycol alginate

Sucrose fatty ester

Sodium hydroxymethylcellulose (or pectin)

Sodium tripolyphosphate

Sodium pyrophosphate

2. The stabilizer according to Claim 1, characterized in that the formula concentration (parts by weight) of each ingredient is as follows:

Sodium polyacrylate	3-8
Propylene glycol alginate	28-32
Sucrose fatty ester	32-38
Sodium hydroxymethylcellulose (or pectin)	8-12
Sodium tripolyphosphate	12-14
Sodium pyrophosphate	6-8

Detailed explanation of the invention

Stabilizer for acidic protein beverages

This invention pertains to a stabilizer exclusively for protein beverages, particularly pertaining to a stabilizer resistant to high temperature for protein in acidic solution.

It is well known that acidic flavoring agents such as lactic acid, acetic acid and phosphoric acid are added in acidic protein beverages to impart an acidic taste resembling that of fruit, and the pH is usually in the range of 3.5-4.5. In this pH range, acid denaturing of proteins occurs easily, resulting in coagulation and precipitation. Additionally, thermal denaturing also occurs when proteins are heated during the sterilization process, causing coagulation and precipitation. In the prior art, a single stabilizer is utilized with a supplementary nonionic emulsifier when preparing acidic beverages such as fruit yogurt, acidic soy milk and acidic peanut syrup, to prevent acidic denaturing and precipitation of proteins. However, every stabilizer has its limitation. For example, propylene glycol alginate (PGA) is not soluble in water, while also not stable toward heavy metal ions such as trivalent Fe and divalent copper ions; pectin forms gels with a minute quantity of divalent calcium ion or divalent magnesium ion, which adversely affects the appearance of the product; sodium hydroxymethylcellulose (CMC) degrades slowly in acidic solution, while also easily forming precipitates with metal ions of more than two valence. Therefore, each stabilizer is only effective for certain proteins. For example, PGA is effective only for milk proteins, pectin only for yogurt or fruit yogurt, and CMC only for vegetable proteins. Although recently there are people who apply multiple stabilizers to solve the aforementioned drawbacks, the most important issue is that the problem of lacking thermal stability has not yet been solved. The stabilizing effect of the aforementioned single or multiple stabilizers diminishes if the sterilizing temperature exceeds 100°C and the

heating time is over 3 min, which also markedly reduces the viscosity of the stabilizer, causing precipitation after only 3 months in storage.

The purpose of the present invention lies in providing a stabilizer for acidic protein beverages having high thermal stability and showing no precipitation after long storage with wide pH application range. It is a high-temperature-resistant, acidic stabilizer for protein beverages highly effective for vegetable proteins, egg proteins and milk proteins, and in general, no precipitate is formed after more than 10 months in storage.

The application method of the present invention is as follows: Adding sodium polyacrylate as a new type of high-temperature-resistant stabilizer to protein beverages in addition to a conventional stabilizer for acidic protein beverages which is based on PGA, sucrose fatty ester, CMC or pectin, sodium tripolyphosphate and sodium pyrophosphate. Since this substance exhibits an excellent modifying effect on the membrane surrounding proteins, it can demonstrates high-temperature resistance and acid resistance, which increases the strength of the membrane surrounding the proteins at high temperature. In other words, the membrane continues to behave in a mesomorphic state at high temperature. This entirely prevents thermal denaturing of the proteins. When the temperature exceeds 100°C, for example, when sterilization is conducted at 124°C, the stability is still quite excellent and the product can be stored for more than 10 months without forming precipitates. The formulating ratio (parts by weight) of each ingredient is shown as follows:

Sodium polyacrylate (food grade)	3-8
Propylene glycol alginate (viscosity 0.12 Pa·S)	28-32
Sucrose fatty ester (International standard SE-15)	32-38
Sodium hydroxymethylcellulose (International standard FM6 and up) or pectin	8-12
Sodium tripolyphosphate (food grade)	12-14
Sodium pyrophosphate (food grade)	6-8

In the aforementioned formula, if the blending amount of sodium polyacrylate is less than 3 parts by weight, there is no significant thermal stabilizing effect, and if it exceeds 8 parts by weight, suds occur which are difficult to eliminate. The method of preparation in general involves adding propylene glycol alginate and sucrose fatty ester in a mixer equipped with an agitator, which are mixed for 5-10 min, followed by adding sodium polyacrylate and sodium hydroxymethylcellulose or pectin and mixing for 5-10 min, and finally, adding sodium tripolyphosphate and sodium pyrophosphate and mixing for 10-15 min, followed by sieving through a 100-mesh sieve, to give a white to slightly grayish white powder product.

The present invention is further explained in detail using the following preferentially selected examples, but they are not to be construed as limiting the scope of the present invention.

Preparation Example 1

30 kg propylene glycol alginate and 32 kg sucrose fatty ester are added to a conventional mixer of 120-L capacity equipped with an agitator and mixed for 8 min. 4 kg sodium polyacrylate and 10 kg sodium hydroxymethylcellulose are then added and mixed for 8 min. Finally, 13 kg sodium tripolyphosphate and 7 kg sodium pyrophosphate are added and mixed for 12 min, followed by sieving through a 100-mesh sieve, to give 90 kg product.

Preparation Example 2

Except for changing the amount of sodium polyacrylate to 7 kg and using 10 kg pectin to replace sodium hydroxymethylcellulose, everything remains unchanged, and 93 kg product is obtained.

Application Example 1

Based on a conventional method, 1 kg egg protein is diluted in 10 kg water, to which 50 g (predissolved in 4 kg hot water) of the product of the present invention prepared in Preparation Example 1 is added, which is then emulsified at 50° ± 2°C. 4.5 kg sucrose as a sweetener and 0.5 kg sodium citrate as a flavoring agent are added, followed by sterilizing at 124°C ± 2°C for 10 min, to give 20 kg acidic egg protein beverage, which shows no precipitation after 10 months in storage.

Application Example 2

Based on conventional methods, 10 kg peanut protein solution (protein content 2%) are added to 35 g (predissolved in 1 kg hot water) of the product of the present invention prepared in Preparation Example 2, which is then emulsified at 55°C. 400 g Honey as a sweetener and 40 g sodium glutamate as a flavoring agent are added, followed by sterilizing at 124° ± 2°C for 10 min, to give 11.5 kg acidic peanut protein beverage, which shows no precipitation after 10 months in storage.